

1 CLAIMS

2
3 We claim:

4
5 1. A process for safely decontaminating the chill water used in meat processing,
6 which comprises:

7
8 (a) measuring the oxidative-reduction potential of the chill water in the chill
9 bath of the chiller prior to introducing the meat to be processed and
10 chlorine dioxide into the chill water, in order to obtain a reference
11 oxidative-reduction potential for said chill water,

12
13 (b) introducing the meat to be processed into the chill water,

14
15 (c) feeding chlorine dioxide to said chill water to achieve a predetermined
16 target oxidative-reduction potential in the chill water from 400 mV to
17 750 mV,

18
19 wherein the concentration of chlorine dioxide fed is from 100
20 ppm to 3000 ppm, and

21
22 wherein the amount of chlorine dioxide fed is sufficient to
23 increase the oxidative-reduction potential of the chill water to a
24 level that exceeds the reference oxidative-reduction potential
25 established in (a), and achieves the target oxidative-reduction
26 potential referenced in (c), provided that the level of chlorine
27 dioxide in the chill water does not exceed a residual level of 3.0
28 ppm;

29
30 (d) monitoring the oxidative-reduction potential of the chill water;

- 1 (e) monitoring the level of chlorine dioxide gas in the atmosphere
2 surrounding the chill water; and
3
- 4 (f) terminating the flow of the aqueous solution of chlorine dioxide into the
5 chill water, if the oxidative-reduction potential exceeds 750 mV, if the
6 oxidative-reduction potential of the chill water meets the target
7 established in (c), or if the level of chlorine dioxide gas in the
8 atmosphere surrounding the chill water exceeds 0.3 ppm.
9
- 10 2. The process of claim 1 wherein said chlorine dioxide is an aqueous solution of
11 chlorine dioxide generated on site by means of a chlorine dioxide generator
12 achieving a generation efficiency of at least 90% and the oxidative-reduction
13 potential is measured with an sensor oxidative-reduction potential.
14
- 15 3. The process of claim 2 wherein the flow of aqueous chlorine dioxide to the chill
16 water is controlled by a master on-line control unit that receives analog and/or
17 digital signals from the chiller, the chlorine dioxide generator, the oxidative-
18 reduction potential analyzer, and the air quality monitor.
19
- 20 4. The process of claim 3 wherein the oxidative-reduction potential of the chill
21 water and the level of chlorine dioxide gas in the atmosphere surrounding the
22 chill are continuously and simultaneously monitored.
23
- 24 5. The process of claim 4 wherein the master control unit receives a signal from
25 the chiller indicating that the chiller contains chill water and is operational
26 before the chlorine dioxide generator is activated to supply chlorine dioxide to
27 the chill water.
28
- 29 6. The process of claim 5 wherein two or more oxidative-reduction potential
30 analyzers are connected to the on-line master controller and send oxidative-
31 reduction potential signals to the controller that are compared to each other to
32 determine whether there is a discrepancy between them.

- 1 7. The process of claim 6 wherein predetermined target oxidative-reduction
2 potential in the chill water is from 580 mV to 680 mV and the concentration of
3 chlorine dioxide fed is from 750 ppm to 2000 ppm.
4
- 5 8. The process of claim 7 wherein the master on-line controller initiates a probe
6 wash using a pump and/or a probe freshwater back flush if one or both of the
7 ORP analyzers indicate a low ORP or if a discrepancy exists between the
8 analyzers, which exceeds a limit considered to be unacceptable, and wherein an
9 alarm is activated signaling such condition.
10
- 11 9. The process of claim 8 wherein an alarm is signaled when the level of chlorine
12 dioxide gas in the atmosphere surrounding the chill water exceeds 0.1 ppm.
13
- 14 10. The process of claim 9 wherein the flow of the aqueous solution of chlorine
15 dioxide into the chill water is terminated if the level of chlorine dioxide gas in
16 the atmosphere surrounding the chill water exceeds 0.25 ppm.
17
- 18 11. The process of claim 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 wherein an interlocking circuit
19 connects the on-line master control unit to the chlorine dioxide generator and
20 terminates the flow of chlorine dioxide to the chill water if the chlorine dioxide
21 level in the chill water or the surrounding air is unacceptable or if the target
22 oxidative-reduction potential is met.
23
- 24 12. The process of claim 11 wherein an alarm is activated if the oxidative-reduction
25 potential of the chill water is such that the chlorine dioxide level of the chill
26 water is unacceptably high or if the chlorine dioxide gas in the atmosphere
27 surrounding the chill water is unacceptably high.
28
- 29 13. The process of claim 12 wherein the meat processed is poultry or seafood.
30
- 31 14. The process of claim 13 wherein all data described is collected and stored by the
32 master control unit and is available for download either locally or remotely.

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2 15. The process of claim 14 wherein the data is downloaded remotely by a land-
3 based telephone line or cellular technology.

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